Haleh Akrami

akrami@usc.edu • Los Angeles, CA • (213) 706-7723 • LinkedIn
Personal webpage: https://haleakrami.github.io/

Research interests

Signal and Image Processing, Deep Learning, Unsupervised learning

Education

- University of Southern California, PhD., 2018-Current, Biomedical Engineering (GPA: 4/4)
- Ferdowsi University of Mashhad, M.Sc., 2014-2017, Biomedical Engineering (GPA: 18.88/20)
- Ferdowsi University of Mashhad, B.Sc., 2010-2014, Electrical Engineering – Electronics (GPA: 17.06/20)

Skills

Programming languages

- Proficient in, C/C++/C#, Java and Python.

Tools

- Pytorch, Keras, Tensorflow, MATLAB, MATLAB toolboxes (Psychtoolbox, EEGLAB, LYSIS, SIMULINK), SPSS Minitab, ISE Design Suite.

Personal Skills

- Document preparation in Microsoft Word, Excel and PowerPoint, Visio, Latex Familiar with Adobe Photoshop

Version Control

- Git

Honors and Awards

- **Awarded** GHC Scholarship from AnitaB (2020)
- **Awarded** travel grant for IEEE Int. Symp. Biomed. Imaging Conference (2020)
- **Awarded** USC Viterbi Fellowship for incoming Ph.D. student (2018)
- **Awarded Financial support** for M.Sc. thesis from Cognitive Science and Technologies Council of Iran (CSTC).
- **Awarded** Ferdowsi University of Mashhad **Fellowship** for M.Sc. (2015),
- **Ranked** the second among the students of Biomedical Engineering (2014-2017)

Publication

- Haleh Akrami, Sahar Moghimi, *"Culture modulates the brain response to harmonic violations: an EEG study on hierarchical syntactic structure in music",* Frontiers in human neuroscience, November 2017.
- Samaneh Nemati, Haleh Akrami, Sina Salehi, Hossein Esteky, Sahar Moghimi, *"Lost in music: Dynamic EEG Response to Highly Pleasant Music and Modulation of Outward Attention",* Brain research, May 2019.
- Haleh Akrami, Anand Joshi, Jian Li, Richard Leahy*," Average template for comparison of resting fMRI based on group synchronization of their time series",* In proceeding of 24th Annual Meeting of the Organization for Human Brain Mapping, June 2018.
- Anand Joshi, Jian Li, Haleh Akrami, Richard Leahy, *"A matched filter decomposition of task fmri for extraction of dynamical components",* 25th Annual Meeting of the Organization for Human Brain Mapping, Rome, Jun. 2019.
- Anand Joshi, Jian Li, Minqi Chong, Haleh Akrami, Richard Leahy, *"rfDemons: resting fMRI-based cortical surface registration using BrainSync transform",* 21st International Conference on Medical Image Computing and Computer-Assisted Intervention, Granada, September 2018.

Haleh Akrami

Publication

- Haleh Akrami, Anand Joshi, Jian Li, Richard Leahy, *"Group-wise alignment of resting fMRI in space and time",* In proceeding of SPIE Medical Imaging: Image Processing, San Diego, March 2019.
- Anand Joshi, Jian Li, Haleh Akrami, Richard Leahy, *"Predicting cognitive scores from resting fMRI data and geometric features",* In proceeding of SPIE Medical Imaging: Image Processing, San Diego, March 2019.
- Souvik Kundu, Saurav Prakash, Haleh Akrami, Peter A Beerel, Keith M Chugg, "*pSConv: A Pre-defined Sparse Kernel Based Convolution for Deep CNNs",* 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton), September 2019.
- Anand Joshi, Haleh Akrami, Jian Li, Richard Leahy, *"A Matched Filter Decomposition of fMRI into Resting and Task Components",* International Conference on Medical Image Computing and Computer-Assisted Intervention, October 2019.
- Haleh Akrami, Anand Joshi, Jian Li, Richard Leahy, *"Traumatic brain injury lesion detection using a variational autoencoder",* In proceeding of 73rd Annual Meeting of the American Epilepsy Society, December 2019.
- Haleh Akrami, Anand A. Joshi, Jian Li, Sergul Aydore, and Richard M. Leahy, *"Brain Lesion Detection Using a Robust Variational Autoencoder and Transfer Learning"*, IEEE ISBI 2020.
- Haleh Akrami, Sergul Aydore, Richard Leahy and Anand Joshi. *Robust Variational Autoencoder for Tabular Data with β Divergence.* ICML UDL 2020.
- Haleh Akrami, Anand Joshi, Jian Li, Sergul Aydore, Richard Leahy, *"Robust Variational Autoencoder Using Robust Divergence",* Submitted to IEEE TPAMI.

Research Experience and Projects

- **B.Sc project** software and hardware design and expansion for the USB peripheral of AT91SAM7x, especially HID and MS classes of the USB **(C/C++)**, under supervision of Dr. Noori, Spring and Summer 2014
- **Course Projects:**
  - Implementation of an image processing technique based on reordering of its patches for the purpose of image denoising **(MATLAB),** February 2015
  - Modeling of a test signal with Volterra series, Wiener series, PDM and NARMAX methods **(MATLAB),** February 2015
  - statistical analysis of LFP recordings using frequency domain and time domain techniques and predicting cortical UP and DOWN states by using them **(MATLAB),** February 2015
  - Implementation of generalized orthogonalized PDC (gOPDC), tested using two simulated models with feature dimensions relevant to EEG activities **(MATLAB),** Summer 2015
  - Implementing methods of coding and decoding of a visual-oriented stimulus by using spikes of 5 neurons **(MATLAB),** December 2015.
- **M.Sc project** study EEG differences of syntactic violations recognition in Persian music in comparison to western tonal music and also differences between musicians and non-musician. **(MATLAB).**
  - Recording continuous EEG data from 32 electrodes from musicians and non-musicians' volunteers

Haleh Akrami

Research Experience and Projects

- **Voluntary researcher,** Laboratory for Brain Signal Processing **(MATLAB)**, February 2017- December 2017
  - investigating brain dynamic in motivated forgetting, specifically wavelet analysis of EEG data
  - Recording and analyzing of GSR and EEG signals to investigate musical emotion and its relation to attention.
- **Voluntary researcher,** under supervision of Professor Song, November 2017-Current **(MATLAB)**.
  - EMG prediction from M1 recordings using group lasso.
- **PhD project:** Developing machine learning methods that are proper for real-world datasets such as medical imaging data. I used these methods to locate anatomical and functional brain changes caused by traumatic brain injury and hence, identify distinguishing biomarkers that indicate an increased likelihood of the onset of post-traumatic epilepsy. Working on a variety of related topics, including **(PyTorch)**:
  - Developing robust machine learning methods, including robust variational autoencoders, robust classifiers, robust GAN to an outlier in the dataset.
  - Lesion detection in brain MRI images deploying transfer learning.
  - Estimating uncertainty in autoencoders using quantile regression.
  - Group synchronization algorithm for BrainSync that allows synchronization of rfMRI signals at homologous locations.
  - Developing a method to reduce CNN model complexity which is in the category of pre-defined constrained filter design approaches – i.e., pre-defined Sparse Convolutional (pSConv) layers.

Selected Courses (M.Sc)

- Special Topics – A (The neural code), Dr.Ghorbani, Grade:19.50/20
- Digital Signal Processing, Dr.Saadatmand, Grade:19.75/20
- Modeling of Biological systems, Dr.Moghimi, Grade: 18.50/20
- Dynamical Systems Neuroscience, Dr. Ghorbani, Grade: 18.50/20

Selected Courses (Ph.D.)

- CSCI 455x: Introduction to Programming Systems, Grade 4/4
- ISE633: Large Scale Optimization and Machine Learning, Grade 4/4
- EE599: Special topic- Deep Learning, Grade: 4/4
- EE563: Estimation Theory, Grade:4/4
- BME525: Advanced Biomedical Imaging, Grade: 4/4
- BME502: Advanced Studies of the Nervous Systems, Grade: 4/4
- BME511: Physiological Control Systems, Grade: 4/4
- MATH541a: Introduction to Mathematical Statistics, PASS
- MATH 547: Mathematical Foundations of Statistical Learning Theory

Coursera Courses

- Machine learning, Stanford University, Taught by Andrew Ng
- Fundamentals of Digital Image and Video Processing, Taught by Aggelos K. Katsaggelos
- Principles of fMRI Taught by Martin MSc and Tor Wager

Haleh Akrami

Academic Experience

- **Co-leading** a breakout session in WiML workshop 2020 about "robust machine learning with bad training data"
- **Reviewer** of ISBI2020 conference
- **Supervision** of a free discussion, in English, organized by IEEE Student Branch of Ferdowsi University of Mashhad, Spring 2013
- **Supervision** of a study group, focused on "Implementation of LED Cube using MATLAB and manufacture it", organized by IEEE Student Branch of Ferdowsi University of Mashhad, Summer 2011

Languages

Persian: Native, **French**: beginner, **English**: Fluent

Extracurricular Activities

- President of Iranian Graduate Student Association **(IGSA)** at USC (2019-2020)
- Member of Student Committee for holding the First National Workshop on Intelligent System and Soft computing at Ferdowsi University of Mashhad. (Spring 2011)
- Member of IEEE Student Branch of Ferdowsi University of Mashhad. (2010-2013)
- Member of "industrial relations" Committee for holding the 21st Iranian Conference on Electrical Engineering (ICEE) (March 2013)
- Participated in "Dynamic Brain and the Emergence of Cognition Workshop" (workshop speaker: Professor György Buzsáki)